[0040] **FIG. 20** section (a) is a top, plan view of a fluidic system according to another embodiment of the present invention, section (b) is an enlarged, plan view of a portion the embodiment of section (a), and section (c), parts **0-5**, are photocopies of photomicrographs of a portion the embodiment of section (a) in operation according to one embodiment of the present invention.;

[0041] **FIG. 21** is a plot of equal-splitting index versus position number;

[0042] **FIG. 22** is a photocopy of a photomicrograph of a fluidic system according to another embodiment of the present invention;

[0043] **FIG. 23** section (a) is a plot of fluorescence intensity in absorbance units (a.u.) versus fluid path and section (b) is a plot of theoretical intensity versus measured intensity;

[0044] **FIG. 24** is a photocopy of a photo of one aspect of the present invention; and

[0045] **FIG. 25** is a plot of fluorescence intensity in a.u. versus dilution ratio;

[0046] **FIG. 26** section (a) is a plan view of a fluidic system of the invention and includes an enlarged portion showing a mixing region, and section (b) illustrates the device of section (a) in cross-sectional view;

[0047] **FIG. 27** is a plan view of a fluidic device of the present invention;

[0048] **FIG. 28** section (a) is a plan view of a device of the present invention, including an enlarged section of the device, and section (b) provides a perspective view of the same device;

[0049] **FIG. 29** section (a) provides a perspective view of an enlarged portion of the device of **FIG. 28**, and section (b) provides a cross-sectional view of the same;

[0050] **FIG. 30** is a graphical representation of experimental results for one embodiment of the invention;

[0051] **FIG. 31** section (a) provides a graphical representation of experimental results and section (b) provides a graphical representation of a transformation of the data shown in section (a); and

[0052] **FIG. 32** provides graphical results of a potentiometric titration using one embodiment of the invention.

DETAILED DESCRIPTION

[0053] The present invention is directed to a fluidic system. "Fluidic system," as used herein, refers to a device, apparatus or system including at least one fluid path. In many embodiments of the invention, the fluidic system is a microfluidic system. In some, but not all embodiments, all components of the systems and methods described herein are microfluidic. "Microfluidic," as used herein, refers to a device, apparatus or system including at least one fluid channel having a cross-sectional dimension of less than 1 mm, and a ratio of length to largest cross-sectional dimension of at least 3:1. A "microfluidic channel," as used herein, is a channel meeting these criteria.

[0054] The "cross-sectional dimension" of the channel is measured perpendicular to the direction of fluid flow. Many fluid channels in components of the invention have maximum cross-sectional dimensions less than 2 mm, and in some cases, less than 1 mm. In one set of embodiments, all fluid channels containing embodiments of the invention are microfluidic or have a largest cross sectional dimension of no more than 2 mm or 1 mm. In another embodiment, the fluid channels may be formed in part by a single component (e.g. an etched substrate or molded unit). Of course, larger channels, tubes, chambers, reservoirs, etc. can be used to store fluids in bulk and to deliver fluids to components of the invention. In one set of embodiments, the maximum cross-sectional dimension of the channel(s) containing embodiments of the invention are less than 500 microns, less than 200 microns, less than 100 microns, less than 50 microns, or less than 25 microns.

[0055] A "channel," as used herein, means a feature on or in an article (substrate) that at least partially directs the flow of a fluid. The channel can have any cross-sectional shape (circular, oval, triangular, irregular, square or rectangular, or the like) and can be covered or uncovered. In embodiments where it is completely covered, at least one portion of the channel can have a cross-section that is completely enclosed, or the entire channel may be completely enclosed along its entire length with the exception of its inlet(s) and outlet(s). A channel may also have an aspect ratio (length to average cross sectional dimension) of at least 2:1, more typically at least 3:1, 5:1, or 10:1 or more. An open channel generally will include characteristics that facilitate control over fluid transport, e.g., structural characteristics (an elongated indentation) and/or physical or chemical characteristics (hydrophobicity vs. hydrophilicity) or other characteristics that can exert a force (e.g., a containing force) on a fluid. The fluid within the channel may partially or completely fill the channel. In some cases where an open channel is used, the fluid may be held within the channel, for example, using surface tension (i.e., a concave or convex meniscus).

[0056] The channel may be of any size, for example, having a largest dimension perpendicular to fluid flow of less than about 5 mm or 2 mm, or less than about 1 mm, or less than about 500 microns, less than about 200 microns, less than about 100 microns, less than about 60 microns, less than about 50 microns, less than about 40 microns, less than about 30 microns, less than about 25 microns, less than about 10 microns, less than about 3 microns, less than about 1 micron, less than about 300 nm, less than about 100 nm, less than about 30 nm, or less than about 10 nm. In some cases the dimensions of the channel may be chosen such that fluid is able to freely flow through the article or substrate. The dimensions of the channel may also be chosen, for example, to allow a certain volumetric or linear flow rate of fluid in the channel. Of course, the number of channels and the shape of the channels can be varied by any method known to those of ordinary skill in the art.

[0057] "Fluid path," as used herein, refers to any channel, tube, pipe or pathway through which a fluid, such as a liquid or a gas, may pass. "Enclosed fluid path," as used herein, refers to any fluid path that is substantially contained except at inlets, outlets, contact regions, and the like. "Crossing angle," as used herein, refers to the angle between two intersecting fluid paths measured between a portion of each fluid path upstream of a contact region between two fluid paths. Accordingly, a crossing angle of 180° indicates the fluid paths overlap completely, but are flowing in opposite